

REMARKS

Applicant has amended claims 7 and 14, and cancelled claim 11. Claims 7, 9, 12-14 are pending in this application.

In the amendment, Applicant has incorporated claim 11 into claim 7.

In the Office Action, the Examiner rejected claims 7, 9 and 11-14 under 35 U.S.C. Section 103(a) as being obvious over Schutze (US Patent No. 5689109) in view of either Watanabe or Kino. Applicant respectfully traverses the rejections.

The present invention concerns a laser scanning microscope (LSM) for producing a 3-Dimensional image of a specimen. The 3-D image is obtained by scanning the specimen at varying depths and combining the scanned images. Often, however, the LSM does not produce satisfactory images because many subcellular structures of the specimen move while the LSM is scanning at varying depths.

The present invention proposes using an optical tweezer in the LSM to fix the subcellular structures so that clean and focused 3-D images can be obtained. Adaptation of the optical tweezers is not a simple matter in a 3D scanning microscope though. This is because when the objective of the LSM moves in a z-direction to scan the specimen at different depth, the focus position of the optical tweezers also moves. The movement of the optical tweezers' focus is problematic because the subcellular structures also move according to the changed focus position. In order to compensate for this z-direction movement in the optical tweezers' focus and thereby fix the subcellular structure even when the microscope objective is moving relative to the specimen, the present invention provides movable optics which is separate from the microscope objective which provides the ability to change the focus position of the optical tweezers as the microscope objective moves. The means for changing the focus position uses previously stored or calculated values to move the movable optics (for the optical tweezers) so that the changed focus position of the specimen due to movement of the microscope objective is compensated by the movement in the movable optics. This feature provides the advantage of fixing the subcellular structures to their positions even when the objective moves to scan at varying depths as discussed in the present substitute specification at page 5, line 28 to page 6, line 9.

This novel feature is recited in claim 7 as "means for changing a position of the beam focus of the optical tweezers", **"movable optics, which is separate from a microscope objective, are provided for changing the position of the beam focus of the**

optical tweezers”, and “the means for changing operable to control a displacement of the movable optics by **previously stored or calculated values**”. None of the cited references teach or suggest such a novel combination.

The Examiner stated that Schutze at col. 6 lines 56-57 teaches “that movement of the objective in the z-direction is independent of the movement of the optical tweezers”. Applicant respectfully disagrees. That section of Schutze refers to movement of the objective and not to any additional optics. By contrast, the “movable optics” are different and separate from the microscope objective.

At col. 7 of Schutze, it only mentions that the diverging optics are movable, but nowhere does it mention that movement is for automatic compensation and correction of the objective movement to keep the sample at the same place.

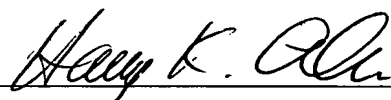
Moreover, in Schutze, there is no coupling between the movement of the microscope objective and the movable optics that move the focus position of the optical tweezers. Accordingly, Schutze teaches away from the present invention as claimed in claim 7.

For the similar reasons as discussed above, Applicant submits that claim 14 is patentable.

Dependent claims 9, 12, and 13 are also patentable by virtue of their dependency from independent claim 7.

Based upon the above amendments and remarks, Applicant respectfully requests reconsideration of this application and its earlier allowance. Should the Examiner feel that a telephone conference with Applicant's attorney would expedite the prosecution of this application, the Examiner is urged to contact him at the number indicated below.

Respectfully submitted,

A handwritten signature in cursive script, reading "Harry K. Ahn", is written over a horizontal line.

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